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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/705,728	11/10/2003	William M. Hiatt	2269-5558E US (99-0253.04)	5029
24247	7590	02/23/2006	EXAMINER	
TRASK BRITT P.O. BOX 2550 SALT LAKE CITY, UT 84110			KOSOWSKI, ALEXANDER J	
			ART UNIT	PAPER NUMBER
			2125	

DATE MAILED: 02/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/705,728

Applicant(s)

HIATT ET AL.

Examiner

Alexander J. Kosowski

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,9,13-18,21-24,28,32 and 33 is/are rejected.
- 7) ☒ Claim(s) 3-8,10-12,19,20,25-27,30 and 31 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>11/21/05</u> . | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

- 1) Claims 1-33 are presented for examination in light of the amendment filed 11/25/05.

***Allowable Subject Matter***

- 2) Claims 3-8, 10-12, 19-20, 25-27 and 30-31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Referring to claims 3, 10 and 30, neither Jensen (USPGPUB 2001/0032111) nor Zhang (U.S. Pat 6,158,346), together or in combination with the prior art of record explicitly teach a method for supporting a substrate during programmed material consolidation comprising disposing a retention lip extending laterally from a raised element over at least a portion of a periphery of a major surface of a substrate, disposing an extension element on an upper surface of a raised element, dispensing unconsolidated material without introducing unconsolidated material onto structures that protrude from the substrate, applying a positive pressure to the bottom surface of the substrate including creating a circulating air flow beneath the bottom surface of the substrate, introducing unconsolidated material including substantially filling the receptacle with unconsolidated material, nor removing excess unconsolidated material from the receptacle following the programmably consolidating, in combination with the remaining elements or features of the claimed invention.

Referring to claims 4-8, 11-12, 20 and 26-27, the claims are dependent on claims 3, 10, 19 and 25 above, respectively, and would therefore also be allowable.

***Claim Rejections - 35 USC § 112***

- 3) The rejections under 35 U.S.C. 112 are withdrawn in light of the amendment filed 11/25/05.

***Claim Rejections - 35 USC § 103***

- 4) The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

- 5) Claims 1-2, 9, 17-18, 21-24, 28-29 and 32-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sanders, Jr et al (U.S. Pat 5,506,607), further in view of Tischler (U.S. PGPUB 2003/0114016).

Referring to claim 1, Sanders teaches a method for supporting a substrate during programmed material consolidation comprising securing the substrate in position over a support surface (col. 13 line 40 through col. 14 line 3) as one or more objects are being fabricated on or adjacent to the substrate by a programmed material consolidation process (col. 12 line 57 through col. 13 line 28). However, Sanders does not explicitly teach preventing unconsolidated material from contacting a bottom surface of the substrate.

Tischler teaches a wafer carrier for use in semiconductor processing including deposition processes (Paragraph 0030), which comprises a dimensionally close fit recess including a retention lip for holding a substrate snugly (Paragraphs 0032 and 0065 and 0077, whereby it is noted that a substrate held in this type of carrier would not be susceptible to deposits contacting its bottom surface).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to hold a substrate such that unconsolidated material is prevented from contacting a bottom surface of the substrate in the invention taught by Sanders since a dimensionally close fit substrate carrier would permit a wafer carrier to hold a substrate in place through all processes (Tischler, Paragraph 0051), since this would allow a substrate to fit snugly and frictionally within the recess of a wafer carrier (Tischler, Paragraph 0065), and since it is noted that it is desirable to prevent unconsolidated material from contacting the bottom of a substrate since this would minimize the amount of cleaning and contamination a substrate is exposed to.

Referring to claims 2 and 9, Sanders teaches the above. However, Sanders does not explicitly teach that securing the substrate in position over the support surface is effected by positioning the substrate at least partially within a receptacle formed by at least one raised element, nor that positioning the substrate comprises positioning the substrate within a receptacle formed by at least one raised element that substantially surrounds the substrate.

Tischler teaches a wafer carrier for use in semiconductor processing including deposition processes (Paragraph 0030), which comprises a dimensionally close fit recess including a retention lip surrounding the substrate for holding a substrate snugly (Paragraphs 0032 and 0065 and 0077 and Figure 2).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to position the substrate at least partially within a receptacle formed by at least one raised element that substantially surrounds the substrate in the invention taught by Sanders since a dimensionally close fit substrate carrier would permit a wafer carrier to hold a substrate in

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place through all processes (Tischler, Paragraph 0051), and since this would allow a substrate to fit snugly and frictionally within the recess of a wafer carrier (Tischler, Paragraph 0065).

Referring to claims 17-18 and 21, Sanders teaches removing the substrate from the support surface by applying a positive pressure force to the bottom surface of the substrate (col. 14 lines 15-47, whereby a shearing force is a positive pressure force).

Referring to claim 22, Sanders teaches a programmable material consolidation method comprising positioning at least one substrate (col. 13 line 40 through col. 14 line 3), introducing unconsolidated material onto a surface of the substrate and programmably consolidating at least portions of the unconsolidated material (col. 19 line 64 through col. 20 line 58, whereby powder may be used). However, Sanders does not explicitly teach that the substrate is positioned in a receptacle of a retention system including a raised periphery that laterally surrounds the at least one substrate.

Tischler teaches a wafer carrier for use in semiconductor processing including deposition processes (Paragraph 0030), which comprises a dimensionally close fit recess including a retention lip laterally surrounding a substrate for holding the substrate snugly (Paragraphs 0032 and 0065 and 0077 and Figure 2).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to position the substrate in a receptacle of a retention system including a raised periphery that laterally surrounds the at least one substrate in the invention taught by Sanders since a dimensionally close fit substrate carrier would permit a wafer carrier to hold a substrate in place through all processes (Tischler, Paragraph 0051), and since this would allow a substrate to fit snugly and frictionally within the recess of a wafer carrier (Tischler, Paragraph 0065).

Referring to claims 23-24, Sanders teaches that introducing unconsolidated material comprises forming a layer of unconsolidated material of a desired thickness over the at least one substrate, then selectively consolidating regions of the layer and repeating the acts of forming and selectively consolidating at least once (col. 19 line 64 through col. 20 line 58, whereby multiple layers are formed).

Referring to claim 28, Sanders teaches introducing unconsolidated material comprises spraying unconsolidated material onto at least a portion of the substrate (col. 19 line 64 through col. 20 line 58).

Referring to claim 29, Sanders teaches that dispensing may comprise a laminar flow (col. 20 lines 31-52).

Referring to claim 32, Sanders teaches the above. However, Sanders does not explicitly teach preventing material from contacting the bottom surface of a substrate.

Tischler teaches a wafer carrier for use in semiconductor processing including deposition processes (Paragraph 0030), which comprises a dimensionally close fit recess including a retention lip for holding a substrate snugly (Paragraphs 0032 and 0065 and 0077, whereby it is noted that a substrate held in this type of carrier would not be susceptible to deposits contacting its bottom surface).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to hold a substrate such that unconsolidated material is prevented from contacting a bottom surface of the substrate in the invention taught by Sanders since a dimensionally close fit substrate carrier would permit a wafer carrier to hold a substrate in place through all processes (Tischler, Paragraph 0051), since this would allow a substrate to fit snugly and frictionally within

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the recess of a wafer carrier (Tischler, Paragraph 0065), and since it is noted that it is desirable to prevent unconsolidated material from contacting the bottom of a substrate since this would minimize the amount of cleaning and contamination a substrate is exposed to.

Referring to claim 33, Sanders teaches removing the at least one substrate from the receptacle following programmably consolidating at least portions of the unconsolidated material (col. 14 lines 15-47).

6) Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sanders, further in view of Tischler, further in view of Jensen, JR. et al (U.S. PGPUB 2001/0032111).

Referring to claims 13-16, Sanders and Tischler teach the above. However, they do not explicitly teach that securing the substrate in position over the support surface includes applying a negative pressure to the bottom surface of the substrate, positioning the substrate over a sealing element with a peripheral portion of the bottom surface of the substrate contacting the sealing element, nor breaking a seal between the sealing element and the bottom surface of the substrate.

Jensen teaches a substrate carrier comprising a recess for holding a substrate (Paragraph 0042), comprising a vacuum for exerting negative pressure on a substrate to hold it in place (Paragraph 0042), as well as a sealing element contacted by the bottom surface of a substrate (Paragraph 0043, whereby the sealing element would be broken upon removing the substrate).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to apply negative pressure on the bottom surface of a substrate and to utilize a sealing element in the invention taught above since a vacuum would allow a carrier to hold a wafer in place during processing (Jensen, Paragraph 0042), and since a sealing element would prevent



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ingress and trapping of particles between the sealing element and the back surface of a substrate (Jensen, Paragraph 0043).

***Response to Arguments***

7) All arguments are rendered moot in view of the new rejection above.

***Conclusion***

8) Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander J Kosowski whose telephone number is 571-272-3744. The examiner can normally be reached on Monday through Friday, alternating Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Picard can be reached on 571-272-3749. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. In addition, the examiner's RightFAX number is 571-273-3744.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-2100.

Alexander J. Kosowski  
Patent Examiner  
Art Unit 2125

